MICRO WELD

MODEL H & HX

BUTT WELDERS

MICRO PRODUCTS COMPANY

SERVICE MANUAL

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1.0 SPECIFICATIONS

	MODEL H	MODEL HX
Type of Welding Process	Butt Weld	Butt Weld
Welding Range	.125 to .625	.125 to .750
Material Suitability	Steel Rod	Steel Rod
Standard Operating Voltages	460/230 Volts	460/230 Volts
Maximum Line Demand 460 Volt	25amps@100% duty cycle 79amps@10% duty cycle	42 amps@100% duty cycle 133 amps@10% duty cycle
Maximum Line Demand 230 Volt	50amps@100% duty cycle 158amps@10% duty cycle	84 amps@100% duty cycle 266 amps@10% duty cycle
Single Phase AC Transformer	16 KVA @ 50% duty cycle	27 KVA @ 50% duty cycle
Clamp Method Upset Method	Pneumatic, Foot Controlled Pneumatic, Adjustable	Pneumatic, Foot Controlled Pneumatic, Adjustable
Mounting	4-Caster Wheels	4-Caster Wheels

Dimensions and Weights

Height Overall	46”-Truck	
Floor or Bench space	39” x 29” Truck Type	
Welding Die Height	41” - Truck Type	
Weight	560 LBS - Truck Type	

FEATURES

- Micro Weld quality and workmanship
- Heavy-duty construction & components
- East to operate controls
- Low maintenance costs
- Easy to set welding parameters
- Safety electrical switch circuits
- Heavy-duty weld heat selection switch
- Sensitive straight slide movable headpiece assembly

2.0 GENERAL OPERATING INSTRUCIONS

2.1 ELECTRICAL HOOK-UP INSTRUCTIONS

First determine that available electrical service in your plant corresponds to the nameplate rating located on welder housing. Electrical wiring to welder must be of sufficient size to deliver full ampere load with no appreciable loss during weld cycle. The welder will not operate properly if there is more than a 10% variation in the line voltage. In general, the welder should be fused with a slow blow fuse of the 100% duty cycle rating. The minimum power cable size to the welder can be obtained by using this same current rating.

Refer to National Electrical Code and local electrical regulations for adequate power sizes; disconnect methods and fusing guidelines.

Remember line voltages to the welding machine are potentially dangerous should the power cords be damaged or severed. The welding voltages at the welding dies will not harm an operator since they do not exceed 10 volts.

2.2 SAFETY PRECAUTIONS
(See section 11.0)

2.2.1 ELECTRICAL

Maintain electrical cable to welder in good repair. Welder must be grounded and connections securely tightened. Heat Switch must not be changed to new position while a weld cycle is in process. Disconnect electrical service before serving welder – high voltages are located within the base of the welder.

2.2.2 MECHANICAL

Operator while using welder must wear safety glasses. Keep all safety guards on welders and use properly. Operators must be instructed on basic operation of unit to prevent injury. Check nameplate rating and keep within material size range for each welder.

2.3 WATER HOOK-UP

(If so equipped)

It is important that if a welder is to be operated for an extended period of time and heads heat up, water lines must be connected to the welder. Connect hoses to inlet and outlet provided at the back of the welder. Shut-off valve should be installed in the inlet line and the hose from the outlet should run to an open sight drain. Water should be turned off when the welder is not in use.

2.4 AIR HOOK-UP

Set air regulators for form 20 to 80 lbs. A safety pop-off valve will be activated when air gauge is set for over 100 lbs.

2.5 WELDING DIES

The dies and shoes supplied with the welder will handle most size and material types within the range of the welder. For new weld applications consult the factory for special die and shoe sets.

3.0 BASIC OPERATING PARTS

3.1 WELD HEAT SELECTION SWITCH

Welding heat is selected by means of a heavy-duty tap switch, either six (6) or twelve (12) steps of voltage. The switch is located conveniently on the lower front of the welder. Number one (1) indicates high heat; number six (6) or twelve (12) indicates low welding heat. Other numbers are equally graduated from high to low to allow just the right amount of voltage for the weld operation. The model H has a six (6) point heat switch and the Model HX has a twelve (12) point heat switch,

3.2 HEAD SPACING MECHANISM

3.2.1 The open head space adjustment bolt and locking jam nut are located on the upset cylinder mounting plate to the immediate left front of the upset cylinder. The open space scale also located on the front of the upset cylinder mounting is a quick reference guide for determining the amount of open space by lining up the pointer on the movable head endplate with the graduations on the scale. When the pointer is in line with no. O on the scale. There is a .020" space between the inside of the welding dies. There is an increase of 1/4" spacing between the dies for each graduation on the scale.

3.2.2 The closed head stop bolt and locking jam nut are located in the movable head endplate in line with the open space-adjusting bolt. The closed space stop should be adjusted so that there is never less than .020" spacing between the dies. The minimum .020" spacing must be maintained as an electrical safety feature otherwise damage will occur to the machine.

3.3 LIMIT SWITCH

The weld limit switch controls the cut-off point of current flow to the welding dies. Limit switch adjustment is made by moving the switch-initiating barrel, along the threaded stud mounted in the movable headpiece. (See section 8 for suggested settings).

3.4 WELDING DIES

The welding dies (lower and upper die shoes), serve three purposes: (1) to carry current for welding, (2) to align two ends of stock, and (3) to prevent material slippage during a weld cycle. Small rod is placed in the smaller grooves and the larger rod is placed in the bigger grooves.

3.5 THE OPERATING LEVER

The welder-operating lever is located at the top of the regulator housing, located on the right end of the welder truck. Keep hands away from clamp arms and headpiece when operating the lever. The lever must be depressed the entire ay when welding. The first part of the lever movement allows the air from the top regulator to pass to the air-upset cylinder. This makes firm contact between the ends of the stock to be welded. At the bottom of the operating lever movement, the lever initiates the weld switch, which starts the weld.

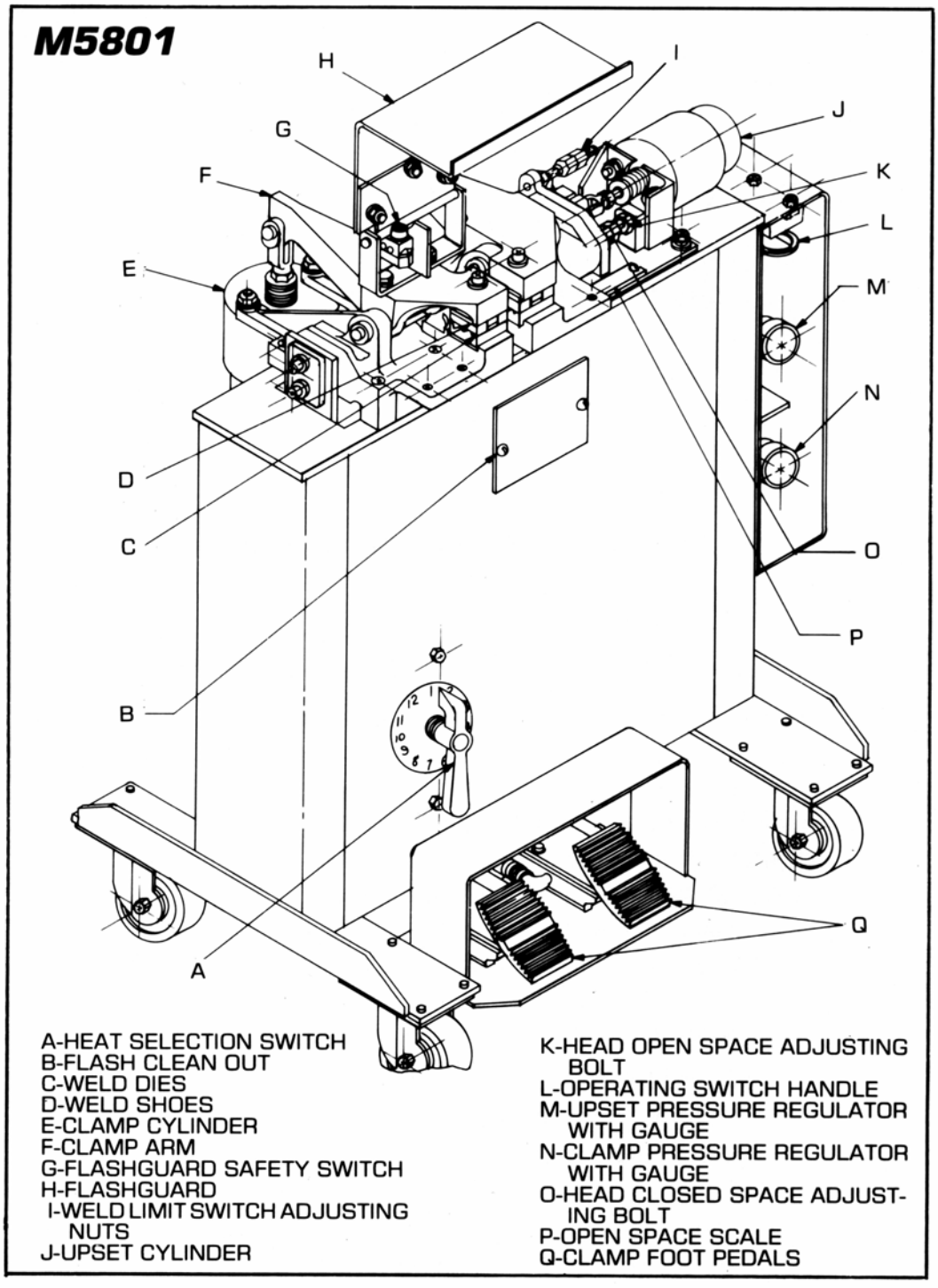
3.6 CLAMP ARMS

The clamp arms are air operated. The foot controlled air valves are used to initiate the air clamp cylinders. The foot valves are located at the bottom of the welder housing. The right foot pedal operates the right clamp arm, and the left pedal operates the left clamp arm. To clamp stock, place it in the proper welding die groove and press the top edges of the tilt pedal on foot valve. To release stock, press on bottom edge of foot valve tilt pedal. Caution: care must be used when clamping stock, be sure hands are clear of clamp arms.

3.7 ANNEAL SWITCH

The anneal switch is located directly above operating lever, it is also known as the weld switch. When annealing make sure to depress the anneal switch only. (See typical anneal sequence)

4.0 BASIC OPERATING PARTS LOCATION



5.0 TYPICAL OPERATING SEQUENCE

All insulating materials must be removed from conductors where they contact lower welding dies.

5.1 Set weld heat selection switch to recommended chart setting.

5.2 Set upset pressure to recommended chart setting (PSI).

5.3 Adjust the head open space to proper chart setting.

5.4 Place the stock into welding dies so wire ends meet midway between each die. Clamp into position with foot valve pedals.

5.5 Lower the flash guard and raise up on the operating lever until it initiates the operation switch, hold for 1 to 3 seconds to assure a complete weld cycle.

5.6 Unclamp welded conductors.

5.7 Trim off weld burr so welded area is equal to parent material diameter. Incomplete burr removal or undercutting of the weld area will result in subsequent weld breaks.

5.8 Typical anneal operating. The stock should be clamped in the anneal clamps with the weld midway between the clamps. Reach above the operating lever and press the weld/anneal switch only. The switch should be jogged on and off to allow the heat to spread out in the stock. Heat the stock to the proper anneal temperature and allow to cool to where there is no color before removing the weld burr. The temperature required for annealing should be slightly above the critical point which varies for different steels. Low carbon steel (1008-1018) should be annealed at about 1650 degrees F., and mild to high carbon steel (1018-1090) at about 1400 degrees to 1500 degrees F. This temperature should be maintained just long enough to heat the weld zone evenly.

DEGREES FARENGIHT	**TEMPERATURE BY COLOR**
750 degrees	Red heat, visible in the darkness
975 degrees	Red heat, visible in the daylight
1290 degrees	Dark red
1470 degrees	Dull cherry red
1650 degrees	Cherry red
1830 degrees	Bright cherry red (too hot)

Note: The critical temperature is quickly identified by the loss of the steel's magnetic properties.

6.0 SPECIAL ADJUSTMENTS

Model H, HX
Refer to section 8.0 for approximate settings.

6.1 WELD HEAT SELECTION

The weld heat selection switch is set simply by rotating the handle with pointer to the number of heat required to make a good weld.

6.2 HEAD SPACING

The closed head stop once set should never need changing. This set to keep the weld dies from hitting each other when upset is activated without stock being clamped in the dies. To make this adjustment turn the air upset regulator to 10 PSI, with the flash guard in the up position lift up on the upset lever to move movable headpiece, now check space between dies, the space should be .020" then loosen the locknut on the closed stop bolt and adjust until the space is correct. Now retighten the locknut.

After adjusting the closed space, the open space can be adjusted to the proper setting for the stock to be welded. Use the open space scale when referring to actual setting.

6.3 LIMIT SWITCH

Loosening the lock nut then turning the tapered adjusting nut to the correct setting makes the limit switch adjustment. Clockwise will turn current off earlier, counterclockwise will turn the current off later. This setting can be used to lessen the amount of weld burr. By adjusting the limit switch to lessen the weld burr, decreased weld quality could result.

6.4 MODEL HX BURN-OFF INSTRUCTIONS

If unit is water-cooled and rate of burn off is high, unit will require the water-cooling to prevent overheating of the dies and headpiece. Connect the input line to one end of water cool circuit. This input line should have a shutoff valve so that water supply can be cut off when not in operation. This will present condensation on headpiece, which could cause transformer burn out. Water output hose should be open – this will allow testing of water temperature. During operation, flow should be adjusted so that output feels warm to hand. This will minimize condensation.

The hand knob at right hand end of truck adjusts the space between the clamping jaws of dies. See setting chart at end of instructions for approximate burn-off settings.

Operating switch is located in aluminum housing at the end of the welder truck. Switch is located at top with switch plunger extending down.

Clamp arms are air operated. The foot-operated valves are located at the bottom of welder housing.

Caution: Care must be used when clamping stock, be sure hands are clear of clamping dies before operating foot valves.

Sequence of operation:
1. Set weld heat and die spacing per chart
2. Clamp stock in jaws
3. Press and hold operating switch till stock between jaws melts and is blown away.

Note: Some cables have filler cord with an asphalt impregnation. The asphalt will melt and run into the jaw grooves. Jaw grooves must be kept clean, also the connection between the jaw and jaw seat so that good electrical connection is maintained.

Stranded Material			
Size	**Heat**	**Space**	**Clamp Pressure**
5/8" diameter	6 or 7	1/8" to 1/4"	80 PSI
3/8" diameter	9	1/8"	80 PSI
5/16" diameter	9	1/8"	80 PSI
1/4" diameter	9	1/8"	80 PSI

Note: Use wire brush to remove zinc oxides and beads from die and shoe grooves. Because of thick zinc coating this cleaning of grooves should be done often to allow good electrical contact between dies and stock.

7.0 PREVENTIVE MAINTENANCE TECHNIQUE

Keep in Mind that these welders are precision built to last many years, but will require good maintenance procedures. They are designed to be as automatic as possible with a minimum dependence on the ability of the operator. Adjustments must be made by those thoroughly familiar with the operating principles of the welders.

7.1 WELDING DIE NOTES

7.1.1 Welding dies and die shoes in poor condition are the primary caused of bad welds.
7.1.2 Check die sets for excessive wear and replace if necessary.
7.1.3 Clean weld die bottoms to remove oxides with emery cloth placed on a flat surface.
7.1.4 Clean die seats with emery cloth to brighten contact areas.
7.1.5 After cleaning of dies be sure to wipe off with soft clean cloth.
7.1.6 Completely tighten dies into seats to assure a good contact.
7.1.7 Worn die shoes will not hold stock during a weld cycle, change steel faces or replace complete shoes.

7.2 WEEKLY

7.2.1 Tighten all loose parts.
7.2.2 Check for water leaks (if applicable).
7.2.3 Check for air leaks.
7.2.4 Drain airline filter bowls.
7.2.5 Tighten all loose parts.

7.3 QUARTERLY

7.3.1 Repeat above service items.
7.3.2 Check grease requirements on clamp arms pivot shafts and lubrication points.
7.3.3 Check anneal parts and replace all worn or broken assemblies
7.3.4 Check contacts on magnetic contactor for worn contacts.
7.3.5 Clean heat switch contacts with low residue cleaner and recoat with petroleum jelly.

7.4 ANNUALLY

7.4.1 Repeat previously noted items.
7.4.2 Check for wear in clap arm pivots.
7.4.3 Clean inside and outside of welder.
7.4.4 Check grease requirements on headpiece slide shafts, grease lightly.
7.4.5 Caution: make sure that power supply is disconnected before servicing welder in anyway!

7.5 WELDING DIES AND DIE SHOES INFORMATION

Description:

Welding dies – Lower conducting electrode and clamp jaw.

Welding die shoes – Upper clamping member.

Welding dies and die shoes in poor condition are the main causes of bad welds.

Care of die sets:

7.5.1 Use a brass or fiber blade to remove particles of flashings that build-up on die sets. Excessive flash build-up causes die burns on material and shorting of die sets.

7.5.2 Do not attempt to clamp material that is not suited for welder into die sets. Undersize materials will slip and burn die grooves, oversize materials will overstress clamping parts.

7.5.3 Do not use welding die sets for a vise. These parts will not withstand the mechanical abuse.

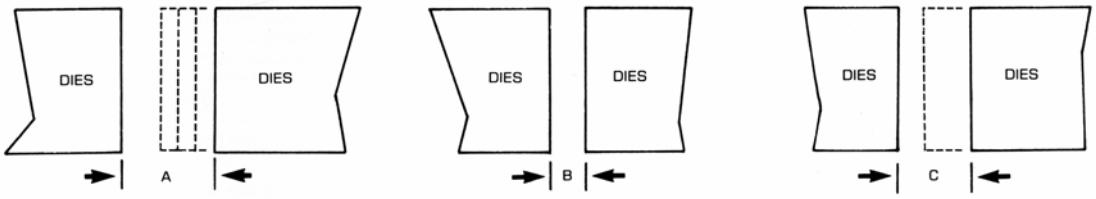
7.5.4 Whenever welding dies are replaced, clean bottoms of dies and corresponding die seats to a bright and clean condition before bolting them tightly into place. An oxidized surface will insulate the welding dies and reduce effective welding voltage.

7.5.5 Welding die set will wear with use and must be changed occasionally for good welding results. Keep and adequate supply of replacement parts available. Wire and rod slippage is a problem caused by poor die sets and a major cause of wire breaks.

8.0 SUGGESTED SETTINGS

ROD SIZE	WELD PRESSURE	A HEAD OPEN	B HEAD CLOSED	C LIMIT SWITCH	H WELD HEAT	H-X WELD HEAT
.125"	15 lbs	1½	.020"	5½	N/A	9
.187"	20 lbs	2	.020"	5½	N/A	8
.250"	25 lbs	2	.020"	5½	6	7
.312"	25 lbs	3	.020"	5½	5	6
.375"	30 lbs	3	.020"	5½	4 or 3	5
.500"	40 lbs	3½	.020"	4½	2	4
.625"	40 lbs	3½	.020"	4½	1	3
.750"	50 lbs	4	.020"	4½	N/A	2

Note: All settings are approximate and further adjustments may be necessary.



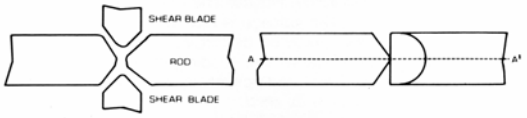
A - OPEN HEAD SPACE
ADJUST SCREW WITH HEAD OPEN ADJUSTING SCREW. APPROXIMATELY 1½ TO 2 TIMES DIA OF ROD.

B - CLOSED HEAD SPACE
ADJUST WITH HEAD STOP SCREW
.020" MINIMUM

C - LIMIT SWITCH
5½ · 3/16"
4½ · 5/32"

8.1 RECOMMENDED SHEAR CUTS FOR WELDERS

PINCH CUT SHEAR EXAMPLE



PLACE IN DIE GROOVES AS ILLUSTRATED: CROSSING CUT ENDS.

NOTE: A - A' DESIGNATION INDICATES POSITION OF FRAYING SURFACES FOR OPTIMUM: WELD ALIGNMENT, WELD HEAT AND UPSET PRESSURE UTILIZATION.

EXAMPLES OF GOOD WELDS

A GOOD WELD WITH CORRECT BURR AND EVEN HEAT PENETRATION.

A GOOD WELD WILL BREAK ACROSS WELD ON A BEND TEST.

EXAMPLES OF POOR WELDS

A POOR WELD WITH IMPROPER UPSET AND A MINIMUM AMOUNT OF HEAT PENETRATION.

A POOR WELD WITH LITTLE FUSION AND NO UPSET BURR.

BURR REMOVAL EXAMPLES

Weld burr must be removed as close to parent metal as possible. Incomplete burr removal or excessive grinding will cause tension breaks on subsequent wire drawing operations.

Bend test: The weld burr should be positioned the diameter of the rod above vise jaws and bent back forth until rod breaks. A good weld will break across or on either side of the weld.

9.0 DIAGNOSTIC CHART FOR TROUBLE-SHOOTING

WELDING ACTION	CAUSE	REMEDY
Weld action normal but weld burr doesn't extend beyond wire	Lack of spacing	Increase starting space until desired burr is obtained
Molten metal is blown out and ends not joined	Weld heat too high	Lower heat settings
	Stock is too small	Check size rating of welder
	Low upset pressure	Adjust upset air regulator
Weld has complete burr but is dry and breaks off below surface of wire	Upset pressure too great	Lower upset pressure
	High carbon steel wire	Carbon-steel wire often appears like this, process wire by annealing weld before removing burr
Welds good but poorly aligned	Welding dies & die shoes	Replace worn dies and shoes
	Starting space	Decrease starting space
	Loose head shafts	Return heads to factory
Ends of wire buckle and may not weld	Upset pressure too great	Decrease upset pressure
	Low weld heat	Increase weld heat
Varying weld results	Stock slipping	Increase clamp air pressure
	Varying weld voltages	Check electric lines
		Clean and tighten transformer connections to heads
	Rod condition variations	Clean rod where clamped in dies
	Dies and die shoes	Replace die shoes
	Flashings	Clean build-up of flash materials

9.1 ELECTRICAL TROUBLE-SHOOTING OF WELDER

(Caution!! Extreme care should be exercised when making these tests. Dangerous voltages are present in the welder. Only persons familiar with electrical safety precautions should perform these tests.)

9.1.1 TROUBLE-SHOOTING TABLE
(See section 9.1.3)

This electrical trouble-shooting table is furnished as a suggested method of trouble-shooting the welder. The individual steps of the table should be performed in the order given, to make the tests valid. The electrical schematic (section 10) furnished for these tests show the table test points. The table may be used for welders with a different but closely related wiring by using corresponding test points. During all tests, line voltage should be connected to L1 & L2 of the welder. The heat switch should be set to the #1 position.

9.1.2 FINAL ELECTRICAL CHECKS

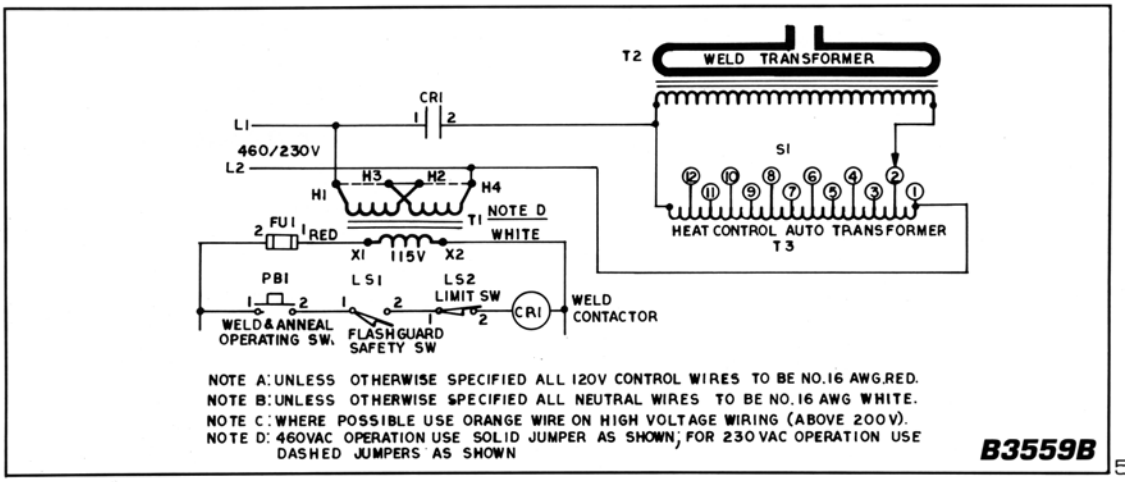
Set the heat switch to the number 1 position, connect the voltmeter across the welding dies. Press the operating switch. The meter reading will typically be less than 10 VAC. Consult the weld specification sheet for this value. Rotate the heat switch through all settings. If the voltage is not read at any setting, the heat switch may be defective. Actuate the weld limit switch; observe the reading goes to zero. Release the weld limit and operating switches, the reading should remain at zero.

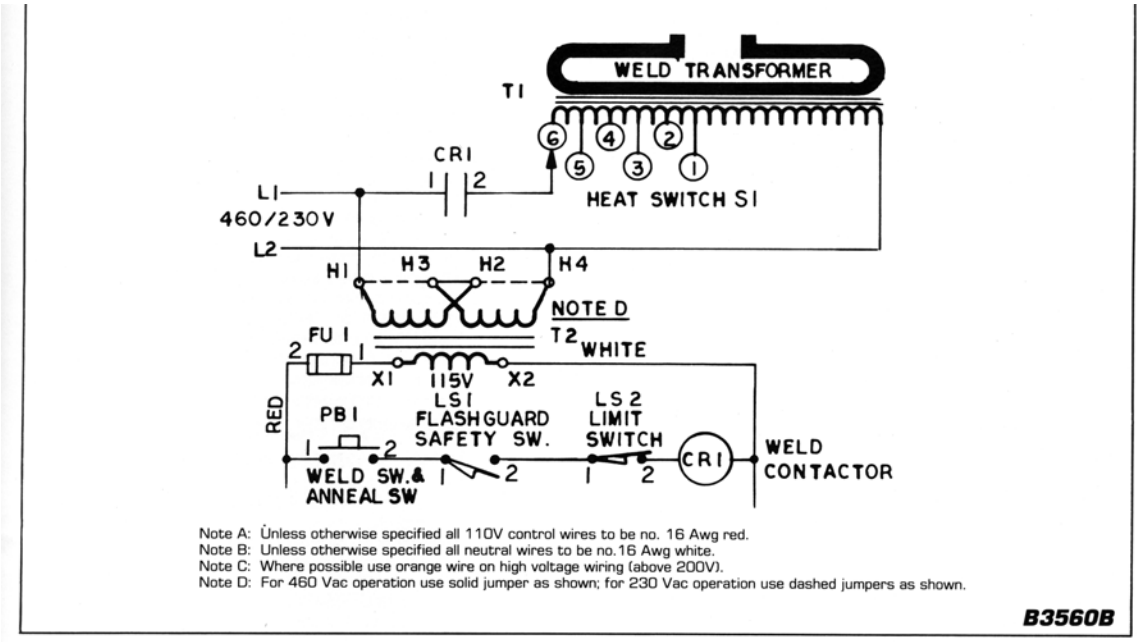
9.1.3

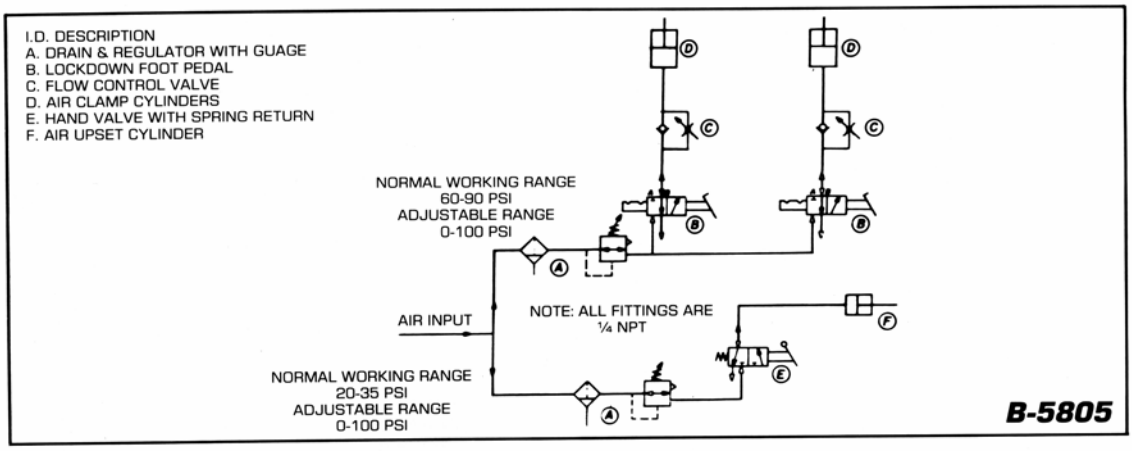
TEST LEAD CONNECTION	METER READING	PROBLEM IF NO READING	PRESS OPERATING SWITCH	WELD LIMIT SWITCH ACCTUATED	PRESS ANNEAL SWITCH
X1 X2	115 VAC	Bad control transformer(T1)			
X2 FU1-1	115 VAC	Bad fuse connection			
X2 FU1-2	115 VAC	Open fuse			
X2 LS1-1	115 VAC	Open wire to operating switch			
X2 LS1-2	115 VAC	Bad operating switch	X		
X2 LS2-1	115 VAC	Open wire to flash guard switch	X		
X2 LS2-2	115 VAC	Open flash guard switch	X		
X2 LS3-1	115 VAC	Open wire to weld limit switch	X		
X2 LS3-2	115 VAC	Bad weld limit switch	X		
L2 CR1-1	Line voltage	Open wiring to contactor			
L2 CR1-2	Line voltage	Bad contactor	X		
L1 S1-1	Line voltage	Open wire to head switch	X		

NOTE: To perform repair consult section 13 for parts identification.

10.0 ELECTRICAL SCHEMATIC







11.0 SAFETY REMINDERS

The following accident prevention information is presented to eliminate potential hazards while operating, inspecting or repairing Micro-Weld electric resistance welding equipment.

Important safety compliance information for Micro-Weld Welders.

GENERAL

1. Qualified personnel, prior to using equipment, must instruct an operator on basic operation and malfunction methods.
2. Safety eyeglasses must be worn by all personnel operating or servicing welders.
3. Use safety equipment properly and keep safety equipment on welders.
4. Determine that both operating voltages and hertz (cycles) of power supply correspond to ratings listed on welder nameplate located on welder housing.
5. Check nameplate ratings and keep within capacities and material categories stated therein.
6. Adjustments or repairs must be made by persons thoroughly familiar with operating principles of welder.
7. Welder must be disconnected from power supply prior to maintenance or repair procedures.

ELECTRICAL

1. Refer to National Electrical Code and local regulations for adequate electrical wiring to power welder. Do not operate welder with inadequate electrical power supply cords or cable.
2. All welders must be grounded through power supply and welder ground connection terminal securely tightened.
3. All welders must be able to be disconnected from power source either by a double breaking disconnect switch or unplugged by standard rated plugs.
4. All welders must be fused to prevent injury should an electrical malfunction occur. Welders must never be fused for an ampere load that exceeds the ratings stated on welder nameplate. Normally welders are fused using the nameplate rated load; time lag parameters functional to standard fuses allow this specification.
5. Electric power cords to welder must be kept in good condition. Report any damage or potential hazards to maintenance personnel.
6. The weld heat selection switch, potentiometer or range selection devices must not be changed to a new position while a weld operation is in process.

12.0 BUYERS GUIDE

HOW TO ORDER PARTS:

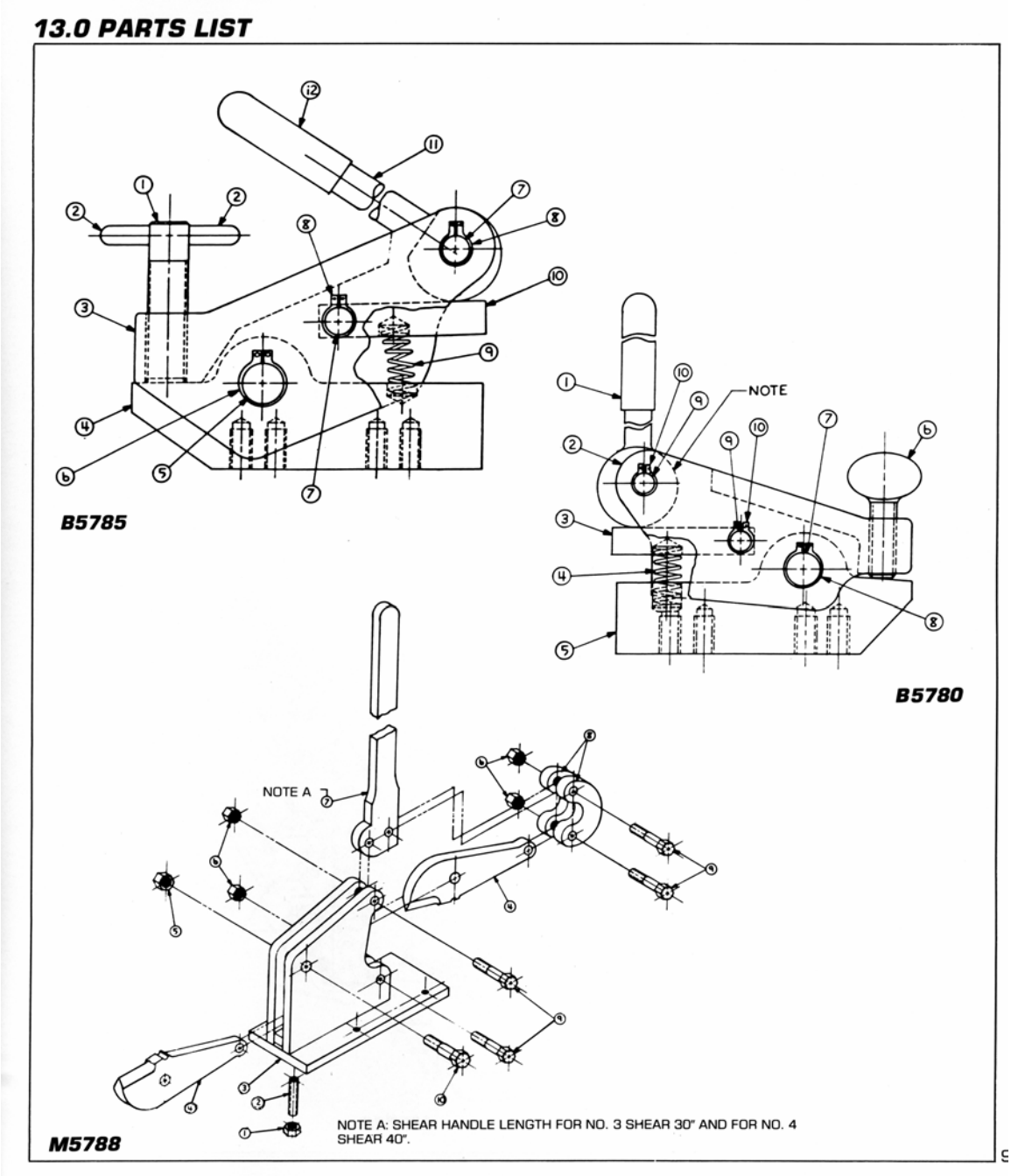
You must provide
1. Machine Model
2. Machine Serial Number
3. Voltage

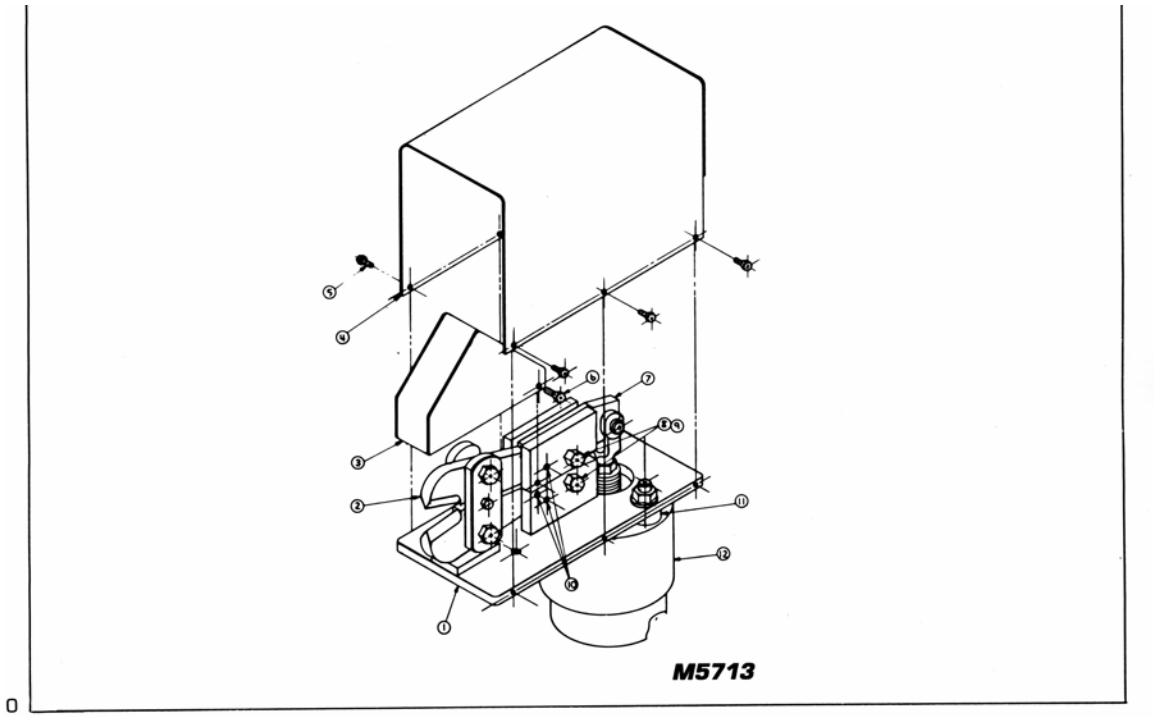
Then identify part(s) on part list (last page in book) and provide MICRO with the circled number.

CALL MICRO at 800-872-1068
OR FAX MICRO at 630-787-9360

Provide MICRO with your company name and purchase order number.

13.0 PARTS LIST

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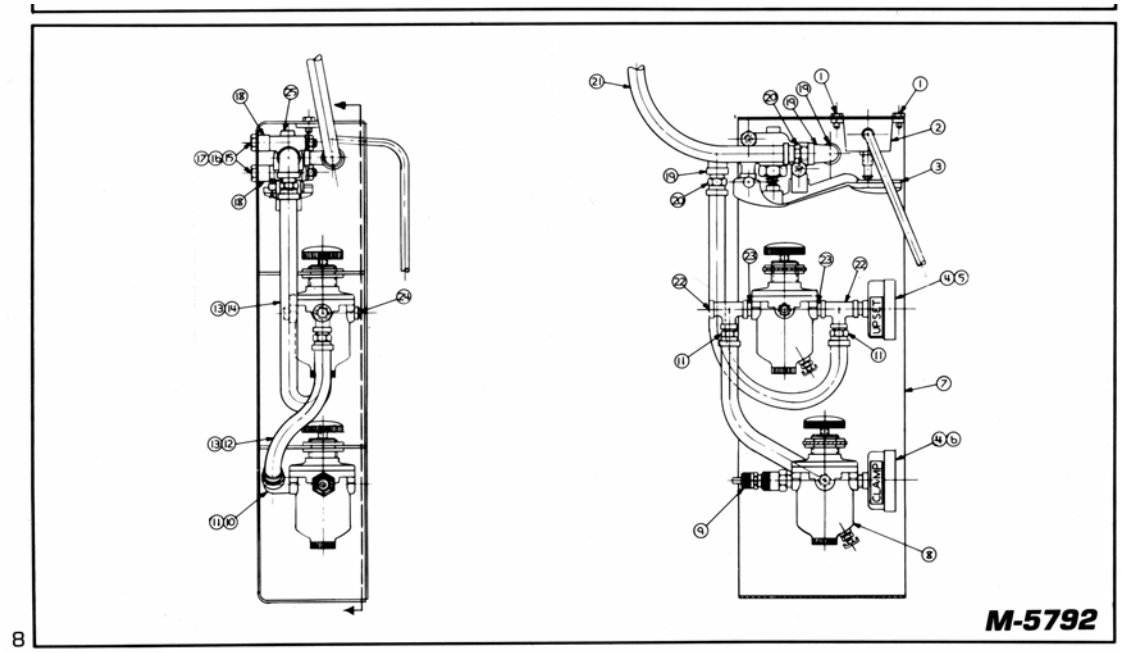
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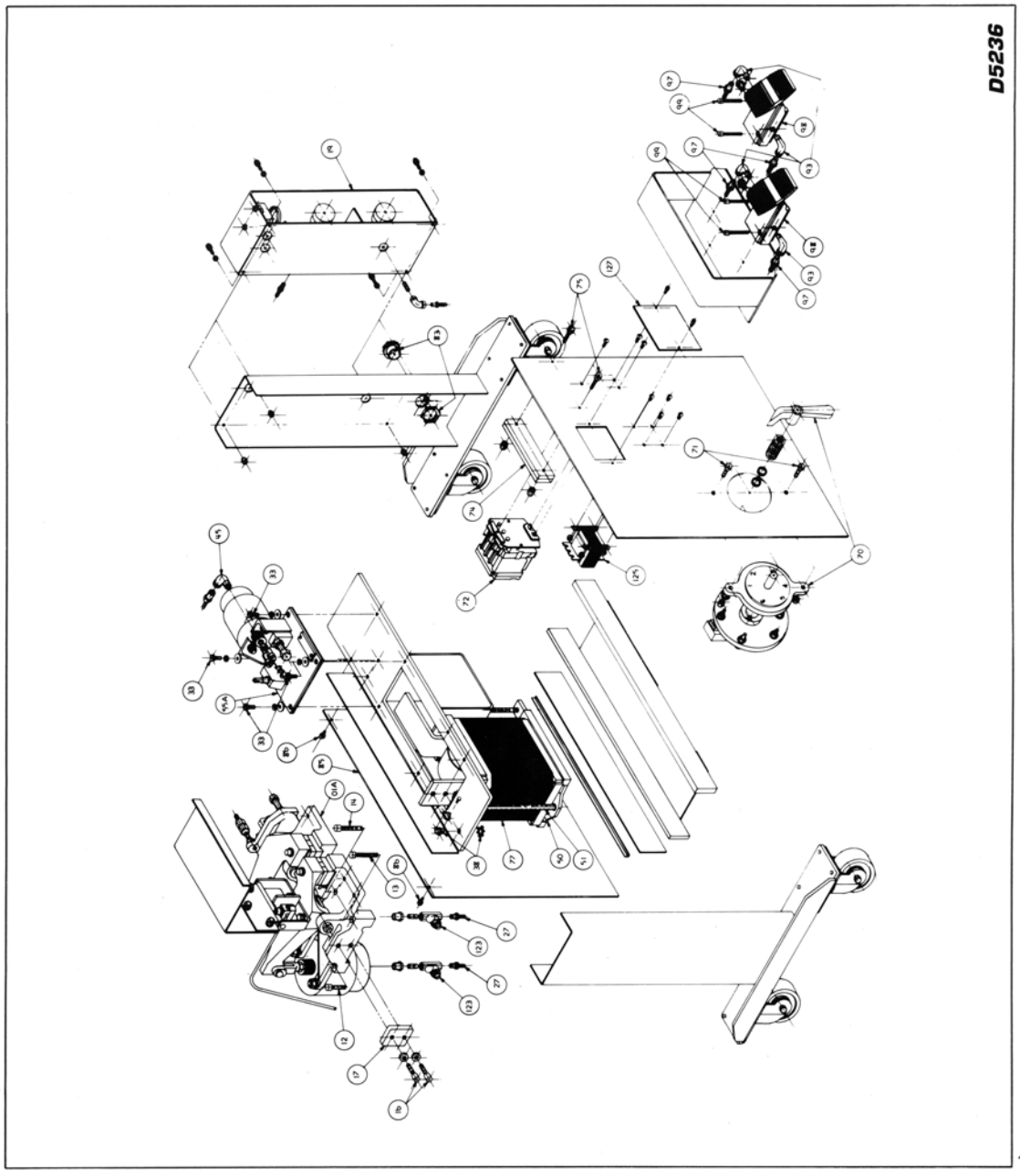
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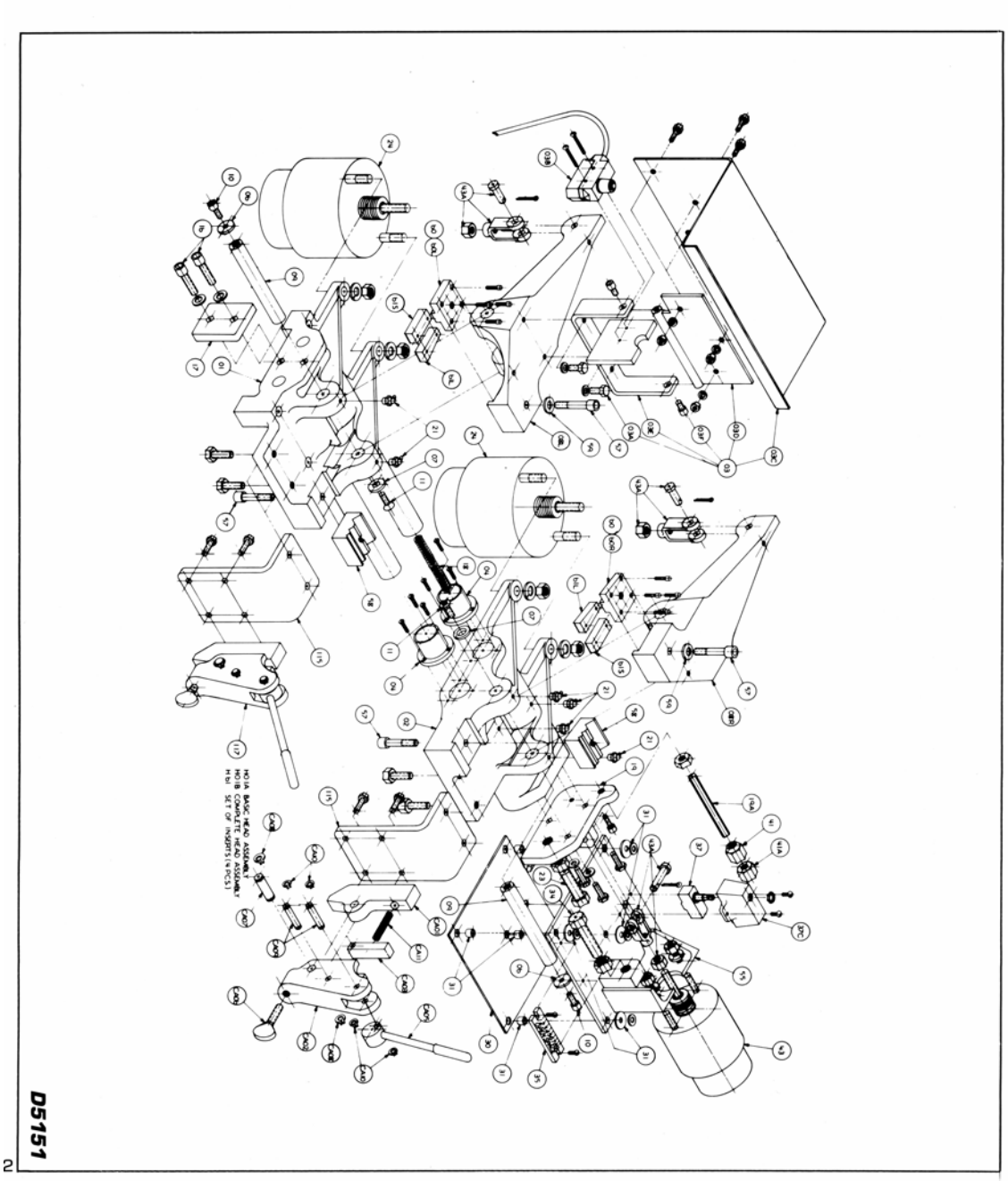
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PARTS LIST
H, HX SERIES BUTT WELDERS

MODEL/ PART NO.	DESCRIPTION	ITEM #
H-01A	Basic head match machined	31054
H-01B	Complete head assembly	31055
H-03	Flash guard assembly	31056
H-03A	Flash guard mount screw	90258
H-03B	Flash guard switch	57813
H-04	Shaft shield	31014
H-05	Shaft shield mount screw	90821
H-06	Outer clamp arm pin washer	31546
H-07	Inner clamp arm pin washer	31006
H-08L	Clamp arm, left	31017
H-08R	Clamp arm, right	31030
H-09	Clamp arm pivot pin	31000
H-10	Outer arm pin bolt	90258
H-11	Inner arm pin screw	90811
H-12	Stat. Head mount bolt, rear	90657
H-13	Stat. Head mount bolt front, left	90663
H-14	Stat. Head mount bolt front, right	90664
H-15	Secondary mount bolts, movable	90509
H-16	Secondary mount bolts, stationary	90659
H-17	Secondary clamp plate, stat. Head	51000
H-18	Head return spring, mov. head	80056
H-19	End plate, movable head	41076
H-19A	Limit switch scale screw	31009
H-20	End plate mount bolt	90260
H-21	Grease fitting 90 degrees	48422
H-22	Grease fitting, straight	48423
H-23	Closed head stop bolt	90327
H-23A	Closed head stop nut	92106
H-24	Clamp cylinder #20	77703
H-25	Cylinder shaft protecting boot	77715
H-26	Cylinder diaphragm #20	77710
H-27	Hose fitting, brass	94302
H-30	Insulating plate, upset frame	41002
H-31	Insulating washers & tubes	31061
H-32	Steel washers, upset frame	92751
H-33	Upset frame mount screws	90260
H-34	Open head stop bolt & nut	90329
H-35	Open space scale	41005
H-36	Scale mount screws	91048
H-37	Limit switch, roller type	57811
H-37C	Limit switch cover	51001
H-39	Limit switch mount screws	91048
H-41	Limit switch actuator nut	31008
H-41A	Actuator nut locknut	31007

PARTS LIST
H, HX SERIES BUTT WELDERS

MODEL/ PART NO.	DESCRIPTION	ITEM #
H-42	Cylinder shaft boot #12	77715
H-43	Rotochamber #12, upset	77700
H-44	Cylinder diaphragm #12	77708
H-46	Weld transformer, state voltage & S/N	51008
H-47	Transformer primary coil, state voltage & S/N	53037
H-48	Transformer secondary, state voltage & S/N	51011
H-49	Transformer support strap	33291
H-50	Transformer ring	51002
H-51	¾" transformer stud	51005
H-52	½" transformer stud	90301
H-55	Upset cylinder mount plate	41003
H-57	Die mount bolt	90660
H-58	V-groove dies, copper	31020
H-58R	Radius groove die set	31042
H-59	Shoe mount washers	92753
H-60	Shoe set w/inserts	31053
H-60L	Steel shoe, left	31001
H-60R	Steel shoe, right	31002
H-61	Set of inserts, 4 pcs.	31052
H-61L	Steel insert, for left shoe	31004
H-61R	Steel insert, for right shoe	31005
H-61S	Steel insert, straight	31003
H-62	Insert mount screw	90704
HX-68	Auto transformer	51019
HX-68A	Primary coil, auto transformer	51018
H-70	6 pt. Heat switch	56549
H-71	Heat switch mount bolts	90294
H-72	Weld contactor 440V	57609
H&HX-72	Weld contactor 240V	57610
HX-72	Weld contactor 240V	57611
H-72A	Contactor repair kit	57625
H-74	Terminal block	53000
H-75	Terminal block mount screws	90204
HX-76	12 point heat switch	56547
HX-77	Weld transformer, 2 tap	53047
HX-78	2 tap primary	51027
HX-79	Secondary	51026
H-80	Complete truck	41096
H-81	Swivel caster	48108
H-82W	Wheel only	spcl.
H-85	Truck door	41014
HX-97	Foot pedal muffler	77892
H-98	Foot pedal	77859
H-104	#4 shear	64009
H-109	Vise, standard	78112

PARTS LIST
H, HX SERIES BUTT WELDERS

MODEL/ PART NO.	DESCRIPTION	ITEM #
HX-109A	Heavy duty vise	78111
H-110	Vise bracket	60022
HX-110	Vise bracket	60004
HX-110A	Heavy duty vise bracket	60005
H-111	Vise mount bolt	90262
H-114	#4 shear blades	78204
H-115	Anneal bracket, CA	62085
H-116	Anneal bracket mount screw	90509
H-117	CA anneal clamps, pair	62096
H-118	Anneal mount bolts, CA	90258
H-119	Anneal bracket, CAL	62085
H-120	CAL anneal clamps, pair	62020
H-122	Anneal mount bolts, CAL	90258
H-123	Clamp arm flow control valve	77862
H-125	Control step-down	57601
H-125A	Fuse block	58119
H-126	Heavy duty step-down	59523
H-A19	Complete air frame assembly	59511